

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

### Listing of Claims:

1. (Currently Amended) A process for preparing an alkylaromatic hydrocarbon composition comprising contacting a feedstock comprising an olefinic hydrocarbon mixture and an aromatic compound under alkylation conditions with an aromatic alkylation catalyst selected from a homogeneous acid catalyst and a heterogeneous acid catalyst comprising a molecular sieve having an X-ray diffraction pattern including d-spacing maxima at  $12.4 \pm 0.25$ ,  $6.9 \pm 0.15$ ,  $3.57 \pm 0.07$  and  $3.42 \pm 0.07$  Angstroms selected from a molecular sieve of the MCM-22 family, said olefinic hydrocarbon mixture comprising at least 5% by weight of mono-olefin oligomers of the empirical formula:



wherein n is greater than or equal to 10, wherein said mono-olefin oligomers comprise at least 20% by weight of olefins having at least 12 carbon atoms and said olefins having at least 12 carbon atoms and an average of from 0.8 to 2.0 C<sub>1</sub>-C<sub>3</sub> alkyl branches per carbon chain and no branches other than ethyl ~~groups~~ groups;

wherein said olefinic hydrocarbon mixture is produced by oligomerizing an olefin selected from propene, butene and mixtures thereof over surface-deactivated ZSM-23.

2. (Original) The process of claim 1 wherein said olefins having at least 12 carbon atoms have an average of from 0.8 to 1.3 C<sub>1</sub>-C<sub>3</sub> alkyl branches per carbon chain.
3. (Cancelled)
4. (Previously Presented) The process of claim 1 wherein said olefinic hydrocarbon mixture comprises at least 20% by weight of said mono-olefin oligomers.

5. (Cancelled)
6. (Previously Presented) The process of claim 1 wherein said mono-olefin oligomers comprise from about 50% to about 98% by weight of olefins having less than or equal to 12 carbon atoms and from about 2% to about 50% by weight of olefins having more than 12 carbon atoms.
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Previously Presented) The process of claim 1 wherein said olefinic hydrocarbon mixture also contains linear alpha-olefins containing at least 10 carbon atoms.
11. (Previously Presented) The process of claim 1 wherein said feedstock also comprises up to 80wt% of paraffins.
12. (Cancelled)
13. (Original) The process of claim 12 wherein said molecular sieve is selected from MCM-22, PSH-3, SSZ-25, ERB-1, ITQ-1, ITQ-2, MCM-36, MCM-49 and MCM-56.
14. (Cancelled)
15. (Previously Presented) The process of claim 12 wherein said alkylation conditions include a temperature of from 100°C to about 350°C, a pressure of about 1 to about 25 atmospheres, a WHSV of about 0.5 hr<sup>-1</sup> to about 100 hr<sup>-1</sup> and an aromatic compound to olefinic hydrocarbon mixture mole ratio of about 1:1 to about 20:1.
16. (Previously Presented) The process of claim 1 wherein said aromatic alkylation catalyst is a homogeneous acid catalyst.
17. (Original) The process of claim 16 wherein said homogeneous acid catalyst comprises a Lewis acid catalyst.

18. (Cancelled)
19. (Cancelled)
20. (Previously Presented) The process of claim 16 wherein said homogeneous acid catalyst is HF or phosphoric acid.
21. (Previously Presented) The process of claim 16 wherein said alkylation conditions include a temperature of from about  $-10^{\circ}\text{C}$  to about  $50^{\circ}\text{C}$ , a pressure of from about 1.0 to about 5.0 atmospheres, a feed weight hourly space velocity (WHSV) of from about  $0.2\text{hr}^{-1}$  to about  $10\text{hr}^{-1}$  and an aromatic compound to olefinic hydrocarbon mixture mole ratio of from about 1:1 to about 15:1.
22. (Previously Presented) The process of claim 1 wherein said aromatic compound is selected from the group consisting of benzene and toluene.
23. (Withdrawn) An alkylaromatic hydrocarbon composition produced by the process of claim 1.
24. (Withdrawn) An alkylaromatic hydrocarbon mixture comprising a plurality of alkylaromatic hydrocarbons each having:
  - (a) at least 12 carbon atoms in its alkyl side chain,
  - (b) an average of from 0.8 to 2.0  $\text{C}_1\text{-C}_3$  alkyl branches per alkyl side chain and no branches in said alkyl side chain other than  $\text{C}_1\text{-C}_3$  alkyl,
  - (c) an average of less than 0.1 quaternary carbon atoms in said alkyl side chain and
  - (d) at least 95% of the aromatic species being located at the 2- or 3- position in the alkyl side chain.
25. (Withdrawn) The alkylaromatic hydrocarbon mixture of claim 24 wherein the aromatic moiety is selected from phenyl and tolyl.

26. (Withdrawn) A process for making an alkylaryl sulfonate mixture comprising sulfonating the alkylaromatic hydrocarbon composition of claim 23.
27. (Withdrawn) A process for making an alkylaryl sulfonate mixture comprising sulfonating the alkylaromatic hydrocarbon mixture of claim 24.
28. (Withdrawn) A process for preparing an alkylaryl sulfonate mixture comprising the steps of:
- (a) contacting a first feedstock comprising a first olefinic hydrocarbon mixture and an aromatic compound under alkylation conditions with an aromatic alkylation catalyst to produce a first alkylaromatic hydrocarbon composition, said first olefinic hydrocarbon mixture comprising at least 5% by weight of mono-olefin oligomers having the empirical formula:



wherein n is greater than or equal to 10 and less than or equal to 12 and having an average of from 0.8 to 2.0 C<sub>1</sub>-C<sub>3</sub> alkyl branches per carbon chain;

- (b) contacting a second feedstock comprising a second olefinic hydrocarbon mixture and an aromatic compound under alkylation conditions with an aromatic alkylation catalyst to produce a second alkylaromatic hydrocarbon composition, said second olefinic hydrocarbon mixture comprising at least 5% by weight of mono-olefin oligomers having the empirical formula:



wherein n is greater than 12 and having an average of from 0.8 to 2.0 C<sub>1</sub>-C<sub>3</sub> alkyl branches per carbon chain;

- (c) forming a mixture comprising about 50% to about 98% by weight of said first alkylaromatic hydrocarbon composition and about 2% to about 50% by weight of said second alkylaromatic hydrocarbon composition; and
- (d) sulfonating the mixture produced in step (c).

29. (Withdrawn) An alkylaryl sulfonate mixture produced by the process of claim 26.
30. (Withdrawn) An alkylarylsulfonate mixture comprising a plurality of alkylarylsulfonate compounds each having:
- (a) at least 12 carbon atoms in its alkyl side chain,
  - (b) an average of from 0.8 to 2.0 C<sub>1</sub>-C<sub>3</sub> alkyl branches per alkyl side chain and no branches in said alkyl side chain other than C<sub>1</sub>-C<sub>3</sub> alkyl,
  - (c) an average of less than 0.1 quaternary carbon atoms in said alkyl side chain,
  - (d) at least 95% of the aromatic species being located at the 2- or 3- position in the alkyl side chain,
  - (e) a Krafft temperature below 10°C and
  - (f) a hard water insolubility of less than 1 wt%.
31. (Withdrawn) The alkylarylsulfonate mixture of claim 30 wherein the aromatic moiety is selected from phenyl and tolyl.
32. (Currently Amended) A process for preparing an alkylaromatic hydrocarbon composition comprising the steps of:
- (a) oligomerizing an olefin selected from propylene, n-butene and mixtures thereof, over a catalyst comprising ZSM-23 and a surface deactivating agent, to form an oligomerization product comprising at least 95% by weight of mono-olefin oligomers of the empirical formula:
$$C_nH_{2n}$$
wherein n is greater than or equal to 10, wherein said mono-olefin oligomers comprise at least 20% by weight of olefins having at least 12 carbon atoms and said olefins having at least 12 carbon atoms and an average of from 0.8 to 2.0 C<sub>1</sub>-C<sub>3</sub> alkyl branches per carbon chain;
  - (b) contacting the oligomerization product and an aromatic compound under alkylation conditions with an aromatic alkylation catalyst comprising an

MCM-22 family molecular sieve having an X-ray diffraction pattern including d-spacing maxima at  $12.4 \pm 0.25$ ,  $6.9 \pm 0.15$ ,  $3.57 \pm 0.07$  and  $3.42 \pm 0.07$  Angstroms selected from a molecular sieve of the MCM-22 family,

wherein the oligomerization product is not subject to any pretreatment other than to remove the surface deactivating agent prior to the contacting step.

33. (New) A process for preparing an alkylaromatic hydrocarbon composition comprising contacting a feedstock comprising an olefinic hydrocarbon mixture and an aromatic compound under alkylation conditions with an aromatic alkylation catalyst comprising a molecular sieve having an X-ray diffraction pattern including d-spacing maxima at  $12.4 \pm 0.25$ ,  $6.9 \pm 0.15$ ,  $3.57 \pm 0.07$  and  $3.42 \pm 0.07$  Angstroms selected from MCM-22, PSH-3, SSZ-25, ERB-1, ITQ-1, ITQ-2, MCM-36, MCM-49, MCM-56, said olefinic hydrocarbon mixture produced by oligomerizing an olefin selected from propene, butene and mixtures thereof over surface-deactivated ZSM-23 and comprising at least 5% by weight of mono-olefin oligomers of the empirical formula:



wherein n is greater than or equal to 10, wherein said mono-olefin oligomers comprise at least 20% by weight of olefins having at least 12 carbon atoms and said olefins having at least 12 carbon atoms and an average of from 0.8 to 2.0  $C_1$ - $C_3$  alkyl branches per carbon chain and no branches other than ethyl groups.